

CLAIMS

What is claimed is:

1. A water purification system for purifying wastewater, comprising:

an ion exchange unit for removing ions from the wastewater;

a base dosing system provided in fluid communication with said ion exchange unit for raising a pH of the wastewater; and

a high-efficiency reverse osmosis system provided in fluid communication with said base dosing system for removing ions from the wastewater.

2. The water purification system of claim 1 wherein said base dosing system comprises a base dispensing tank for containing a base solution and a dispensing conduit extending from said base dispensing tank for dispensing the base solution into the wastewater.

3. The water purification system of claim 1 wherein said ion exchange unit comprises a tank and an ion exchange resin bed provided in said tank.

4. The water purification system of claim 3 wherein said base dosing system comprises a base dispensing tank for

67,200-1191
2003-0639

containing a base solution and a dispensing conduit extending from said base dispensing tank for dispensing the base solution into the wastewater.

5. The water purification system of claim 1 wherein said high-efficiency reverse osmosis system comprises at least one first stage filter membrane and at least one second stage filter membrane provided in fluid communication with said base dosing system.

6. The water purification system of claim 5 wherein said base dosing system comprises a base dispensing tank for containing a base solution and a dispensing conduit extending from said base dispensing tank for dispensing the base solution into the wastewater.

7. The water purification system of claim 5 wherein said ion exchange unit comprises a tank and an ion exchange resin bed provided in said tank.

8. The water purification system of claim 7 wherein said base dosing system comprises a base dispensing tank for containing a base solution and a dispensing conduit extending from said base dispensing tank for dispensing the base solution into the wastewater.

67,200-1191
2003-0639

9. A water purification system for purifying wastewater, comprising:

an ion exchange unit for removing ions from the wastewater;

a base dosing system comprising at least three first stage membranes and a second stage membrane provided in fluid communication with said ion exchange unit for raising a pH of the wastewater; and

a high-efficiency reverse osmosis system provided in fluid communication with said base dosing system for removing ions from the wastewater.

10. The water purification system of claim 9 wherein said base dosing system comprises a base dispensing tank for containing a base solution and a dispensing conduit extending from said base dispensing tank for dispensing the base solution into the wastewater.

11. The water purification system of claim 9 wherein said ion exchange unit comprises a tank and an ion exchange resin bed provided in said tank.

12. The water purification system of claim 11 wherein said base dosing system comprises a base dispensing tank for containing a base solution and a dispensing conduit extending

67,200-1191
2003-0639

from said base dispensing tank for dispensing the base solution into the wastewater.

13. The water purification system of claim 11 further comprising a plurality of inlet nozzles provided above said ion exchange resin bed for distributing the wastewater onto said ion exchange resin bed and a plurality of outlet nozzles provided beneath said ion exchange resin bed for distributing the wastewater from said tank.

14. The water purification system of claim 13 wherein said base dosing system comprises a base dispensing tank for containing a base solution and a dispensing conduit extending from said base dispensing tank for dispensing the base solution into the wastewater.

15. A method of purifying wastewater, comprising the steps of:

providing an ion exchange unit;

providing a high-efficiency reverse osmosis system in fluid communication with said ion exchange unit;

distributing the wastewater through said ion exchange unit;

raising the pH of the wastewater in a first step; and

raising the pH of the wastewater in a second step by

67,200-1191
2003-0639

distributing the wastewater through said high-efficiency reverse osmosis system.

16. The method of claim 15 wherein said raising the pH of the water in a first step comprises raising the pH of the water from a pH of about 3 to 4 to a pH of about 6 to 7.

17. The method of claim 16 wherein said raising the pH of the water in a second step comprises raising the pH of the water from said pH of about 6 to 7 to a pH of about 8.5 to 10.

18. The method of claim 15 wherein said raising the pH of the wastewater in a first step comprises providing an inlet line between and in fluid communication with said ion exchange unit and said high-efficiency reverse osmosis system, providing a base dosing system in fluid communication with said inlet line, distributing the wastewater through said inlet line, and dispensing a base from said base dosing system into said inlet line.

19. The method of claim 18 wherein said raising the pH of the water in a first step comprises raising the pH of the water from a pH of about 3 to 4 to a pH of about 6 to 7.

67,200-1191
2003-0639

20. The method of claim 19 wherein said raising the pH of the water in a second step comprises raising the pH of the water from said pH of about 6 to 7 to a pH of about 8.5 to 10.